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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,650	12/27/2006	Nicolai Tarasinski	09275W-US	4215

30689 7590 01/15/2009

DEERE & COMPANY
ONE JOHN DEERE PLACE
MOLINE, IL 61265

EXAMINER	
FIORE, LEVON J	
ART UNIT	PAPER NUMBER
3611	
MAIL DATE	DELIVERY MODE
01/15/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/572,650	TARASINSKI ET AL.	
	Examiner	Art Unit	
	LEVON FIORE	3611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Examiner's Response to Applicant's Arguments

Applicant argues that combining Higasa's electric vehicle with an internal combustion engine would be non-obvious, since reference teaches away from such combination.

Higasa discloses that replacing a mechanical transmission with an electric drive, eliminates complex mechanical components. Kawamura does not suggest a mechanical transmission system, but rather teaches to use a generator and a battery on an electrical system. Combination will be obvious due to analogous usage of both systems for vehicle propulsion and regenerative braking. Applicant did not recite such limitation in the claim, thus it is understood that internal combustion engine has to drive the wheels that can also be accomplished through a generator and electric motor system.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 25-47 rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claims 25-47 fail(s) to correspond in scope with that which applicant(s) regard as the invention.

In claim 25, the recitation in line 3 that "an internal combustion engine driving a mechanical drive for driving the rear wheels on the rear axle and a pair of electric drives" is unclear. The internal combustion engine in the instant invention does not drive the electric motors.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 25-32, 36-47 rejected under 35 U.S.C. 103(a) as being unpatentable over Higasa (US 5,465,806) in view of Kawamura (US 4,951,769).

Regarding claim 25, Higasa discloses a steering system for a utility vehicle, the vehicle having a front axle (Fig 1, 27a), a rear axle (Fig 1, 28a), a pair of front wheels (Fig 1, 2a and 2b), a pair of rear wheels (Fig 1, 3a and 3b), a mechanical drive for driving the rear wheels on the rear axle (Fig 1, 26a, b) and a pair of electric drives (Fig 1, 21a and 21b), each for driving one of the front wheels (Fig 1, 2a and 2b), and a controller for controlling the electric drives and causing each electric drive to transmit a defined torque to a corresponding one of the front wheels (intended use, see description of control mechanism in abstract), wherein when the vehicle is turning, the vehicle having a radial outer front wheel and a radially inner front wheel, the electric drive

supplying a greater torque to the outer front wheel and supplying a lesser torque to the inner front wheel (Col 4, lines 38-52).

Higasa does not disclose an internal combustion engine driving a mechanical drive for driving the rear wheels on the rear axle.

Kawamura discloses an internal combustion engine (Fig 1, engine 1) driving a mechanical drive (Fig 1, generator 2 via shaft 1a) for driving the rear wheels on the rear axle (Fig 1, wheels 9).

It would be obvious to one ordinary skill in the art, at the time the invention was made, to modify Higasa such that it comprised a hybrid generator and battery system in view of teachings of Kawamura, as claimed, to allow high efficiency operation (Col 1, lines 50-55)

Regarding claim 26, Higasa discloses a steering system wherein the defined torque is derived from an operating state of the vehicle (Fig 6B, Block K, state derived from wheel rotation sensor) and from an operator input (Fig 6B, Block 35, steering angle input by the operator, by steering the vehicle).

Regarding claim 27, Higasa discloses a steering system wherein the vehicle includes a front axle mechanical steering device (Fig 2, 8), and the operating state comprises a steering angle of the front axle mechanical steering device (Col 1, lines 43-47).

Regarding claim 28, Higasa discloses a steering system wherein the steering angle is detected by a sensor (intended use, see description of steering angle sensor in abstract)

Regarding claim 29, Higasa discloses a steering system further comprising a yaw rate sensor which senses a yaw rate of the vehicle, and the defined torque is derived from the sensed yaw rate (Col 8, lines 60-66).

Regarding claim 30, Higasa discloses a steering system wherein the vehicle includes an input device which can be used by an operator to change a direction of the vehicle (Fig 2, 8).

Regarding claim 31, Higasa discloses a steering system wherein the input device comprises a steering wheel (Fig 2, 8), a joystick, a pedal or a switch on a steering wheel of the vehicle.

Regarding claim 32, Higasa discloses a steering system wherein the defined torque (Col 7, lines 50-57) is derived from a difference between an actual driving direction (sideways direction due to slipping) and a desired driving direction of the vehicle (direction of desired forward motion maintained by the control system).

Regarding claim 36, Higasa discloses a steering system wherein the electric drive comprises an asynchronous electric motor (Fig 11, squirrel cage rotor 77 is evident to asynchronous motor used).

Regarding claim 37, Higasa discloses a steering system wherein a rotational speed sensor is coupled to each wheel (Col 4, lines 6-10).

Regarding claim 38, Higasa discloses a steering system wherein a rotational speed sensor is coupled to the electric drive (Col 4, lines 6-10).

Regarding claim 39, Higasa discloses a steering system wherein the defined torque is computed as a function of the rotational speeds of the wheels (intended use, see description of wheel rotation sensor in abstract).

Regarding claim 40, Higasa discloses a steering system wherein torque transmitted by the electric drive is computed as a function of a difference between a mean value of peripheral speeds of the rear wheels and the peripheral speed of the driven front wheel (Col 8, lines 48-55).

Regarding claim 41, Higasa discloses a steering system wherein the torque transmitted to the wheel driven by an electric drive is limited when a threshold rotational speed of the wheel driven by the electric drive has been exceeded (Col 7, lines 44-50).

Regarding claim 42, Higasa discloses a steering system (Col 7, lines 30-43) wherein the steering system prevents varying the defined torque (torque applied to the wheel) until a defined value of a vehicle operating state has been exceeded (value of positive traction condition, received by sensor input, depending on road condition).

Regarding claim 43, Higasa discloses a steering system (Col 4, lines 38-52), wherein the electric drives are controlled in a non linear fashion to optimize tire wear during large radius (limited tire ware is a by product of differential action produced by varying torque input on inside and outside wheels of a turn) turns and to minimize turning radius during small radius turns (minimizing turning radius is a by product of differential action produced by varying torque input on inside and outside wheels of a turn).

Regarding claim 45, Higasa discloses a steering system wherein the vehicle can be steered by causing the electric drives to transmit differing torques to each of the front wheels (Col 4, lines 38-52).

Regarding claim 46, Higasa discloses a steering system wherein the electric drives are controlled to counter steer the vehicle when moving across a slope (Fig 13b,

counter steering action is shown, thus will also occur if vehicle is also driven across a slope).

Regarding claim 47, Higasa discloses steering system wherein the electric drives are controlled to stabilize the vehicle (Col 7, lines 50-57).

Regarding claim 44, a steering system comprising a differential lock which allows the front wheels to be driven at equal peripheral speeds is well known in the art (As example, GM's "Gov-Lok" locking differential steering system widely used on 1983 Silverado models).

4. Claims 33-35 rejected under 35 U.S.C. 103(a) as being unpatentable over Higasa et al (US 5,465,806) and Kawamura (US 4,951,769), as applied to claim 1 above, and further in view of Henderson (US 5,764,511).

Regarding claim 33, Higasa discloses vehicle having a steering system.

Higasa does not disclose a steering system wherein the desired driving direction of the vehicle is derived from a defined travel route stored in a memory unit.

Henderson discloses a vehicle wherein the desired driving direction is derived from a defined travel route stored in a memory unit (Col 7, lines 11-19).

It would be obvious to one skilled in the art, at the time the invention was made, to modify Higasa such that it comprised a navigation system according to teachings of

Henderson, such to allow the operation of said vehicle remotely and automatically, thus eliminating a need for an operator and driving the vehicle unmanned on a dangerous terrain.

Regarding claim 34, Higasa, as modified, discloses a vehicle wherein a navigation system includes a remote transmitter which transmits navigation signals, and the desired driving direction is derived from the navigation signals (Henderson, intended use, see description of navigation system in abstract).

Regarding claim 35, Higasa, as modified, discloses a steering system wherein a remote control system which includes a transmitter and a receiver on the vehicle, the remote control system allowing the vehicle to be controlled remotely (Henderson, intended use, see description of navigation system in abstract).

Pertinent Prior Art

The following section outlines references comprising features pertaining to applicant's disclosure.

Higley (US 1,984,830) and Pacheco (US 5,689,174) make it known to drive rear wheels of a vehicle with an internal combustion engine, while also enabling auxiliary electrical drive system.

Nakakita et al (US 6,386,305) discloses a control system that implements turning via controlling amount of torque supplied to each wheel.

Ando et al (US 5,388,658) discloses a yaw control system.

Kjaer et al (US 6,422,333) discloses a system adapted to control the stability of a vehicle on an inclined surface.

Matsuno et al (US 5,850,616) discloses a control algorithm adapted to vary the power of the engine via various sensor inputs.

Arai (US 5, 839,535) discloses a vehicle drive train comprising of two different types of motors adapted to drive alternate sets of wheels.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEVON FIORE whose telephone number is (571)270-7020. The examiner can normally be reached on M-F 9:00-17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on (571)272-6669. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LEVON FIORE/ 1/8/2009
Examiner, Art Unit 3611

/Paul N. Dickson/
Supervisory Patent Examiner, Art Unit 3611